

REMARKS

Claims 23, 27, 34, and 44 are pending in this application of which claims 23, 27, and 44 are independent. Claim 82 has been cancelled

The Examiner rejected claim 23 under 35 U.S.C. 112, second paragraph, as being indefinite. Claim 23 has been amended to delete the element including the term "essentially the same morphology."

The Examiner rejected claim 23 under 35 U.S.C. 102(b) as being anticipated by Chung et al. (US 5,039,546). Applicant has amended claim 23 to recite "A process of treating a metallic bone implant having no calcium-phosphate-containing coating, consisting essentially of treating the metallic bone implant with an aqueous solution containing fluoride ions ..."

Chung neither discloses nor suggests the features of claim 23, particularly with respect to treating, with an aqueous solution of fluoride ions, a metallic bone implant having no calcium-phosphate-containing coating. Rather, Chung describes applying a fluoride treatment to a dental implant having a coating that contains calcium phosphate. For example, in col. 4, lines 7-13, Chung describes that:

the process of the present invention, as noted above, is particularly useful to treat HA ceramic or other calcium phosphate ceramic coated metal substrates, although the invention can be used with other coatings, such as tricalcium phosphate, tetracalcium phosphate or other calcium phosphate ceramic coatings and mixtures thereof, such as mixtures of calcium phosphate and HA with noncalcium phosphate ceramics, metals or alloys.

The examples of coatings described in the above passage and elsewhere in Chung all contain calcium phosphate. Nowhere, does Chung disclose or suggest treating, with an aqueous solution containing fluoride ions, a metallic bone implant having no calcium-phosphate-containing coating.

Furthermore, Chung discloses that the purpose of treating the dental implant with fluoride is to increase the strength and lifetime of the calcium phosphate coating. For example, in col. 2, lines 21-29, Chung states that:

the present invention provides a method of treatment to decrease the dissolution rate of the hydroxyapatite coating or other calcium phosphate based ceramic coating formed on a metal substrate and to enhance the stability of the coating strength by soaking the hydroxyapatite or calcium phosphate ceramic coated metal substrates in a fluoride ion containing solution.

Thus, it would not be obvious to a person who is skilled in the art to apply Chung's fluoride treatment to an implant having no calcium-phosphate-containing coating.

The Examiner rejected claims 27 and 34 under 35 U.S.C. 103(a) as being unpatentable over Chung in view of Suzuki (US 4,746,532).

Claim 27, as amended, recites "a process of treating a metallic bone implant, said metallic bone implant having no calcium-phosphate-containing coating and having a surface layer constituted by a metallic oxide, consisting essentially of treating the metallic bone implant with an aqueous solution containing fluoride ions" Neither Suzuki nor Chung, whether taken separately or in combination, disclose the features of claim 27.

Suzuki discloses applying a ceramic material to a metal oxide implant and gives several examples of ceramic materials, some of which contain calcium phosphate, and some of which do not contain calcium phosphate. Suzuki, however, neither discloses nor suggests treating an implant with fluoride ions. Furthermore, one skilled in the art would not be motivated to combine the teachings of Suzuki with respect to an implant having no calcium-phosphate-containing layer with the teachings of Chung, because Chung does not disclose or suggest that applying fluoride ions to an implant having no calcium-phosphate-containing layer would be beneficial. Rather, in Chung, the benefits of fluoride treatment (e.g., improved coating stability and reduced dissolution rate) are disclosed only for implants having coatings that contain calcium phosphate. Furthermore, even if Chung were combined with Suzuki, the combination would not teach the features of claim 27 for the reasons discussed above with respect to claim 23. Claim 34 depends on claim 27 and is patentable for at least the same reasons as claim 27 is patentable.

The Examiner rejected claim 44 under 35 U.S.C. 103(a) as being unpatentable over Chung in view of the admitted prior art. Applicant cited the paper by Damen, Ten Cate, and Ellingsen (herein referred to as the Damen paper), in Applicant's specification on page 7 to

describe a technique for depositing calcium ions. On page 5 of the office action, Examiner asserts that "Chung ... does not teach post treatment with a solution containing calcium ions ... [but that] it would have been obvious to one of ordinary skill in the art at the time of invention to treat the implant [of Chung] with a solution containing calcium ions, in order to determine biocompatibility of the implant."

Claim 44 recites "a method ... comprising a further step, performed after said treatment with the aqueous solution containing fluoride ions, of treating wherein the implant is treated with a solution comprising calcium ions."

In the Damen paper, the method of precipitating calcium ions from a solution of calcium phosphate onto an implant is disclosed for implants composed of titanium or titanium oxide. Damen does not disclose that this technique is useful for other metals or other metals with non-metallic oxide coatings. For example, the first page of the Damen paper discloses that "the oxide surface layer of titanium implants may induce calcium phosphate precipitation" The Damen paper also discloses that "both metallic titanium and specific titanium dioxides were found to induce calcium phosphate precipitation from metastable solutions." The Damen paper further discloses that "no precipitation occurred with titanium powder at concentrations below 1mg/mL." Nowhere, however, does the Damen paper disclose or suggest that the precipitation could occur in the absence of titanium.

Chung's implant is neither disclosed nor suggested to contain titanium. Rather, Chung discloses an implant of an unspecified metal with a calcium phosphate coating. It is not seen why one would apply calcium ions to the Chung implant having the calcium phosphate coating. Therefore, a person of ordinary skill in the art would not be motivated to combine Chung with the Damen paper.

Even if one were to combine Suzuki's titanium substrate with Chung's implant, the combination of Chung, Suzuki, and the Damen paper would fail to teach the features of claim 44. Chung discloses applying a fluoride treatment after coating to the metal substrate with a ceramic coating. Therefore, applying the calcium treatment after the fluoride treatment, as required by claim 44, would require applying the calcium treatment after coating the titanium substrate with

a calcium phosphate coating. However, coating the titanium substrate with the calcium phosphate coating would prevent the solution of calcium ions from contacting the titanium, thus preventing the precipitation of the calcium ions. As such, the combination of Chung, Damen, and Suzuki does not teach the features of claim 44.

Furthermore, according to Chung in col. 1, lines 31-34, it was already well-known in the art that Chung's phosphate containing coating, hydroxyapatite, provides excellent biocompatibility: "The coating of hydroxyapatite on the surface of metal implants provides excellent biocompatibility and can bond tightly with bone." A person of ordinary skill in the art would not have been motivated to apply the biocompatibility test described in the Damen paper to the hydroxyapatite coating of Chung because, at the time of the invention, it was already well-known that such a hydroxyapatite coating provides excellent biocompatibility. Therefore, even if Chung were combined with the "admitted prior art," i.e., the Damen paper, there still would be no suggestion to use calcium ions, since Chung clearly only discloses the calcium phosphate coating and provides no motivation for use of the calcium ions.

Claim 83 recites precipitating the calcium ions from the solution comprising calcium ions. Claim 83 distinguishes over the references for the same reasons as claim 44. It would not be suggested to use a precipitate to provide the calcium ions, as claimed. Claim 84 further limits the process of claim 44 to the metallic bone implant that has no calcium-phosphate-containing coating, and is allowable for reasons discussed above.

It is believed that all of the pending claims have been addressed. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claims, except as specifically stated in this paper, and the amendment of any claims does not necessarily signify concession of unpatentability of the claim prior to its amendment.

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The prior art cited but not applied by the Examiner is seen as neither describing nor suggesting Applicants' invention whether taken separately or in combination with the art applied.

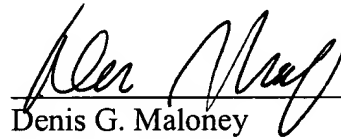
In view of the foregoing amendments and remarks, Applicants respectfully submit that the application is in condition for allowance, and such action is respectfully requested.

Please apply any fees or credits due in this case to Deposit Account 06-1050, referencing Attorney Docket No. 14395-199001.

Respectfully submitted,

Date: _____

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